

REMARKS:

This is a full and complete response to the Office action dated July 9, 2009. Favorable reconsideration of the claims is respectfully requested.

REGARDING THE CLAIMS:

Claims 36-55 are pending in the application. No amendments are made with this reply. Claims 38-45 and 48-55 are objected to but are indicated to be allowable if re-written in independent form. Claims 36-37 and 46-47 stand rejected.

IN RESPONSE TO THE OFFICE ACTION:

REJECTION UNDER 35 U.S.C. § 103 – AINE IN VIEW OF KATO :

Claims 36 and 46 stand rejected under 345 USC §103(a) as being unpatentable over Aine, US 3,903,694 (hereinafter “Aine”) in view of Kato et al., US 5,953,907, (hereinafter “Kato”).

It is Examiner’s position that the Aine reference discloses a device for separating a gas component (NO_x compound) present in an exhaust flow, which provides a selective passage of the gas component before other gas components such as nitrogen, oxygen and CO. The Examiner concedes that Aine fails to disclose an engine adapted for operation by a lean air/fuel mixture. The Examiner also concedes that Aine fails to disclose the detection of an amount of oxide of nitrogen in the exhaust gas flow for controlling the amount of nitrogen present in the exhaust gas flow.

The Examiner attempts to remedy these deficiencies in disclosure by asserting that the “lean air/fuel mixture” recitation in the claims amounts to an intended use statement, and further argues that the Kato reference teaches that it is conventional in the art to utilize a NO_x sensor to detect the amount of NO_x in an exhaust gas.

Applicants respectfully submit that the references, taken alone or in combination, do not disclose, teach or suggest the present claims. Furthermore, one of skill in the art would not combine or modify the references as suggested by the Examiner. Accordingly, Examiner is engaged in impermissible hindsight reconstruction using the Applicants own disclosure as a roadmap for arriving at the above rejection. *MPEP §2145(X)(A)*.

Applicants note the claimed invention relates to an improved catalyst system for vehicle exhausts wherein associated engines are operating with lean mixtures, namely, with an excess of oxygen, susceptible to giving rise to increased proportions of nitrogen oxides (NO_x). In this system, the nitrogen oxides in the exhaust flow are separated out from other constituents. In particular, claims 36 and 46 both recite “a wall structure comprising material which provides a selective passage of the gas component [constituted by an oxide of nitrogen] before other gas components in the exhaust gas flow.” The cited references do not disclose, teach or suggest at least this recitation.

The Aine reference is primarily directed to the separation of smog producing constituents, namely unburned hydrocarbons, while also mentioning the possibility of separating other constituents such as SO₂, CO₂, N₂O, and NO₂. *Aine*, col. 4, lines 43-45. The purpose of separating out the unburned hydrocarbons is to feed them back to the combustion chamber of the engine so that they may be more fully broken down and disposed of. *Aine*, col. 1, lines 56-63; col. 4, lines 12-17.

Applicants submit, contrary to Examiner's assertions, that Aine does not disclose a selective separation of nitrogen oxides. In the first place Aine is not concerned with such oxides as it is with removing unburned hydrocarbons. *Aine*, Col. 4, lines 4-7; abstract; col. 1, lines 56-60. Additionally, Aine discloses that certain nitrogen oxides are not intended to be separated out. In particular, **NO, or Nitric Oxide, is not separated out in the process of Aine.** *Aine*, Col. 4, lines 4-7. As is stated therein:

The effectiveness of membrane 12 **in separating unburned hydrocarbons** and certain other materials such as N₂O, CO₂, NO₂ and SO₂ from other and permanent gas constituents of the exhaust gases, such as N₂, CO, O₂ **and NO**, is influenced by the materials of the membrane, the thickness of the membrane the temperature of the membrane, and the area of membrane. *Aine*, Col. 4, lines 43-49.

From the above portion it can be seen that the separator of Aine actually separates nitrogen oxide components from each other. This is because Aine is primarily directed to separating out unburned hydrocarbons and not to the separation of NO_x constituents. Accordingly, although N₂O and NO₂ are separated out, another nitrogen oxide, namely NO, is not separated out. Furthermore, N₂O and NO₂ are only separated amongst many other constituents, such as

hydrocarbons, these other constituents being the primary targets by **Aine** for removal from the exhaust stream.

Accordingly, it cannot be said that the separator of Aine “provides a selective passage of the gas component (constituted by an oxide of nitrogen) before other gas components” because Aine is not selective for nitrogen oxides. Thus, Aine discloses a separator for hydrocarbons and possibly some other undesired constituents, but does not disclose a selective NO_x separator.

Furthermore, as noted above, in the system of Aine, the unburned hydrocarbons are returned to the engine for combustion. While a person skilled in the art would be aware that hydrocarbons can be returned to an engine for recombustion, the notion of recirculating NO_x would superficially seem to a person of ordinary skill in the art to be a retrograde step and unlikely to work, namely, one that would make the NO_x problem worse. Applicants therefore submit that the claimed invention would not have been obvious at all from the cited references and that the Examiner is engaging in an impermissible retrospective analysis.

Kato

The Examiner has also argued that the Kato reference teaches that it is conventional in the art to utilize a NO_x sensor to detect the amount of NO_x in an exhaust gas. The Examiner concluded that one of skill in the art would have utilized the sensor of Kato to control a flow of air into the into the separation unit of Aine in order to remove any harmful NO_x emissions in the exhaust stream. However, such assertion has no basis and makes little sense, if any, in view of the teachings and purposes of the cited references.

As noted above, Aine discloses that only some of the Nitrogen gases are separated out, namely N₂O and NO₂. However, nitric oxide (NO) is not separated out. Accordingly, in Aine there are NO_x constituents in both the separated gas stream and the unseparated exhaust stream. Accordingly a sensor to reduce NO_x emissions makes little sense because the nitrogen oxides are in both separated and unseparated exhaust streams. The control the Examiner suggests would only affect the NO_x in the separated stream while leaving the unseparated stream untouched. This is because Aine is not concerned with the separation of NO_x constituents. Therefore, there is no reasonable motivation for placing the sensor of Kate in the system of Aine.

In addition to the above, it would appear that Kato is directed to providing the sensor for the amounts of NO_x constituents in order to provide a rich or lean condition depending on how much nitrogen oxide has been adsorbed to a catalyst. *Kato, claim 1; col. 1, lines 46-62*. Such system is similar to that discussed in the background of the invention of the current application in paragraphs 6-10. The drawbacks of such a system are described in paragraphs 11-12 in the current application. Such a system has little to do with the claimed method and device which separates out the nitrogen oxides rendering the need for adsorption and the change between rich and lean conditions unnecessary. Furthermore, this would additionally indicate that there is no basis for Examiner's asserted reason for the combination of references. Accordingly, the system of Aine, taken in combination with Kato still does not disclose, teach or suggest the present claims.

Therefore, in view of the above, Applicants respectfully submit that not prima facie case of obviousness may be established, and request the above mentioned rejection be withdrawn.

REJECTION UNDER 35 U.S.C. § 103 – AINE IN VIEW OF KATO AND CASEY :

Claims 37 and 47 stand rejected under 345 USC §103(a) as being unpatentable over Aine, in view of Kato, and further in view of Casey, US 5,661,973 (hereinafter "Casey").

Applicants re-assert the arguments made above with respect to Aine and Kato. Therefore, as claims 37 and 47 depend from claims 36 and 46 respectively, Applicants submit that for at least the same reasons the above mentioned rejection should also be withdrawn. The Casey reference does nothing to remedy the deficiency of disclosure of the aforementioned references. In fact, as discussed in the Supplementary submission filed March 31, 2009 Casey is concerned with a filter for selectively recovering hydrocarbons for recirculation to the engine. Whereas a person skilled in the art would be aware that hydrocarbons can be returned to an engine for recombustion, the notion of recirculating NO_x would superficially seem to a person of ordinary skill in the art to be a retrograde step and unlikely to work, namely, one that would make the NO_x problem worse. Applicants therefore submit that the claimed invention would not have been obvious at all even additionally in view of Casey.

Accordingly, for at least the above reasons, Applicants request the above mentioned rejection be withdrawn.

In view of the foregoing as well as the previous Remarks, Applicants submit that all pending claims are in condition for allowance, and timely Notice to that effect is respectfully requested.

The undersigned representative requests any extension of time that may be deemed necessary to further the prosecution of this application.

The undersigned representative authorizes the Commissioner to charge any additional fees under 37 C.F.R. 1.16 or 1.17 that may be required, or credit any overpayment, to Deposit Account No. 14-1437, referencing Attorney Docket No.: 0173.019.PCUS00.

In order to facilitate the resolution of any issues or questions presented by this paper, the Examiner may directly contact the undersigned by phone to further the discussion.

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